LOOP & FRAME AERIALS
and ANTENNA TUNING UNITS

LOOPS
A Loop or Frame aerial is a wonderful tool to assist long wave and medium wave reception and, indeed, absolutely essential for serious long distance reception (DX-ing). Fortunately a loop aerial is extremely easy and very cheap to construct, you may even have most of the parts required in your junk box. I offer a few pointers to the construction of loop aerials below.

ATUs
For good Short Wave reception long 'random wire' aerial really is required to dig those distant stations out of the ether. To effectively couple such an aerial to a radio a matching unit called an ATU (Antenna Tuning Unit) can be extremely helpful. An ATU is relatively straightforward to construct and uses simple parts that are quite easy to obtain.
> Go to the ATUs page for a few pointers.

LOOP AERIALS

A loop aerial is extremely helpful when trying to receive long distance stations, not only will it dramatically 'boost' the signal received compared to using a portable radio's internal ferrite rod aerial because a loop aerial is much bigger than a ferrite rod, but it also has two other very useful properties: **Directivity** and **Selectivity**. Directivity is very useful in that it can often be used to 'null out' an interfering station and selectivity is useful to overcome overloading of the radio's 'front end' as the loop will tune very sharply to the required frequency will rejecting all others.

When using a communications receiver a frame aerial might be more convenient than installing a 'long wire' antenna. Although a frame aerial might not collect as large a signal as a really long wire, the directional properties are very useful for nulling out interference from unwanted stations.

Construction

A loop can be made for Medium Wave and Long Wave and can be of almost any size you wish, although it must be small enough to fit in your listening room! The bigger the area of the loop the more signal it will collect, the portable loop described below is around 40 cm in diameter and is probably the smallest size worth considering to be effective and useful.

Traditionally loop aerials have been made on large frames about 1 meter square for use with communications receivers and is essentially just one long piece of thin 'hook-up' wire wound approximately 8 to10 times around a wooden (or other non metallic) frame. The frame can be somewhere between about 50cm square and 1m square - the dimensions are not especially critical

but some experimentation will be required to find the exact number of turns required for a particular size of frame so that the desired tuning range will be obtained. - As the size of the frame is increased the inductance of the windings will increase, therefore it may be found that slightly fewer turns will be needed for correct coverage. For example for the Medium Wave band a 1m square frame may only need - say - eight turns on the main winding compared with ten turns on a smaller frame.

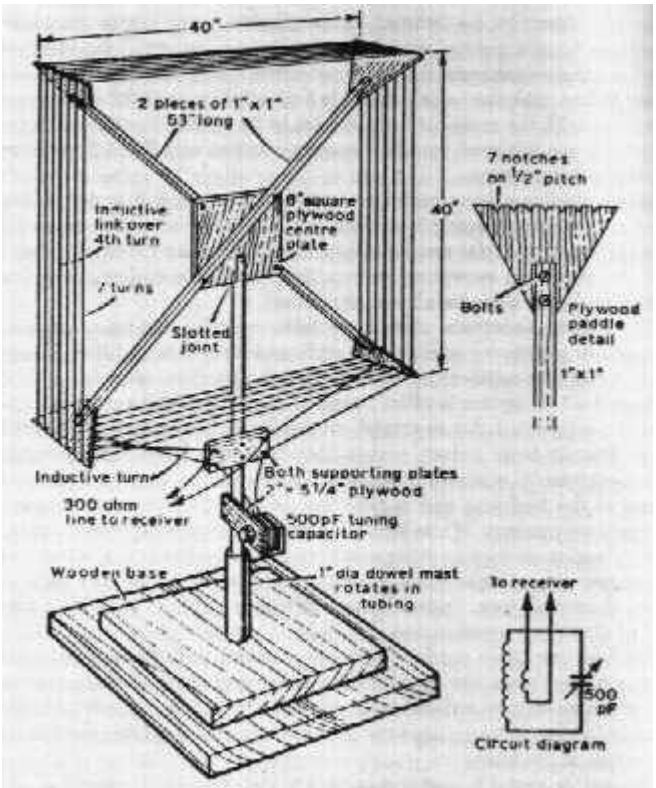
The bigger the area of the frame, the larger the signal pick-up will be.

The wire ends of this main winding are simply connected across pretty much any standard medium wave tuning capacitor with a value of something about 300pF or 500pF or similar. Again this is not especially critical, though like the number of turns of wire it will affect the tuning range. Therefore if a very low value capacitor is used - say 150pF or 200pF - then an additional turn or more on the main winding may be required to enable the lower frequencies to be tuned. Even with a 300pF tuning capacitor it will probably be necessary to include an additional fixed capacitor - connected in parallel with the tuning capacitor - that can be switched in and out of circuit. This will enable the tuned circuit to resonate at lower frequencies and is shown in the diagrams below.

470pF may be a good value to try for the fixed capacitor, but experimentation with different values may be necessary to suit the particular value of tuning capacitor and size of frame being used.

This loop of wire and tuning capacitor form a simple 'Tuned Circuit" which can be tuned across the Medium Wave band using the variable tuning capacitor.

MW and LW Frame Aerial



Constructional details

The illustration opposite was taken from a very old listening guide and shows the basic method of constructing a traditional style large frame aerial. It is 40 inches (100cm) square and made of wood with the loop windings wound over the four plywood 'paddles. I have tried this method and it works very well. Certainly the increased surface area really improves signal pick-up and is ideally suited to 'communications' receivers.

I have also experimented with different shapes, since 40 inches (100cm) can be a bit too wide for some small rooms. My favourite is taller than it is long and is hexagonal in shape being 150cm tall and 70cm wide.

For Medium Wave reception 9 turns are required for the main winding. A switched capacitor to extend the tuning range could also be included if the tuning range is found not to cover the whole of the band.

Coupling or Connecting To The Receiver:

When using a portable radio with a built in ferrite rod ("Loopstick") aerial, it could be quite easy to

A Long Wave Loop Aerial

place the radio inside the loop and therefore use Inductive Coupling between loop aerial and the radio's own aerial. Rotating the loop and radio together for best reception by making use of the aerial's directional properties.

However when using a communications receiver that has a dedicated aerial socket or antenna terminals then the frame aerial must be connected to the radio by a cable. Since a communications receiver will not, in most cases, have a ferrite rod / loopstick antenna, the frame aerial cannot be inductively coupled to the radio in the same way as for an ordinary portable radio:

Therefore a second loop of wire - the inductive coupling loop - is wound over the main winding: This is just one single turn of wire, the ends of which can form a 'fly-lead' that can be connected to the antenna terminals on the receiver. This single turn of wire is shown in blue in the diagrams a little further down this page.

Long Wave

For use for Long Wave reception approximately 30 turns will be needed. The exact number will be established by a little experimentation and adjustment. The photo on the left shows a Long Wave loop aerial. The windings are wound over the 'paddles' described above and consist of 31 turns plus the one coupling turn.

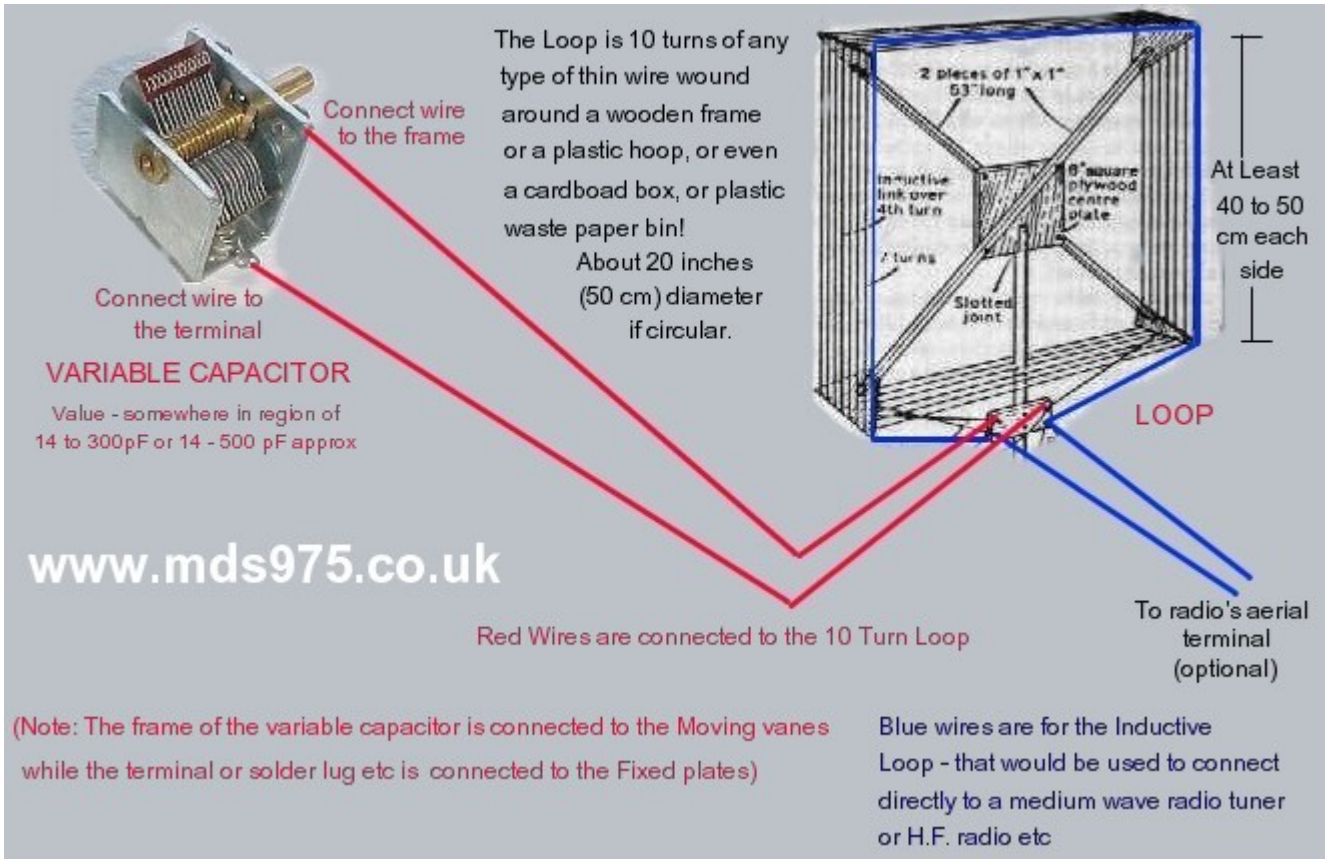
The frame is made from broom handles which are joined together using halving joints and a screw. The base is used for this aerial and a Medium Wave loop aerial and is made from an off-cut of kitchen worktop which is dense and heavy. A block is screwed to the base with a hole bored in it to suit the diameter of the 'broom handle' frames.

The tuning capacitor, switch and sockets are neatly housed in a plasic enclosure of the same type as the one used for the portable loop described above.

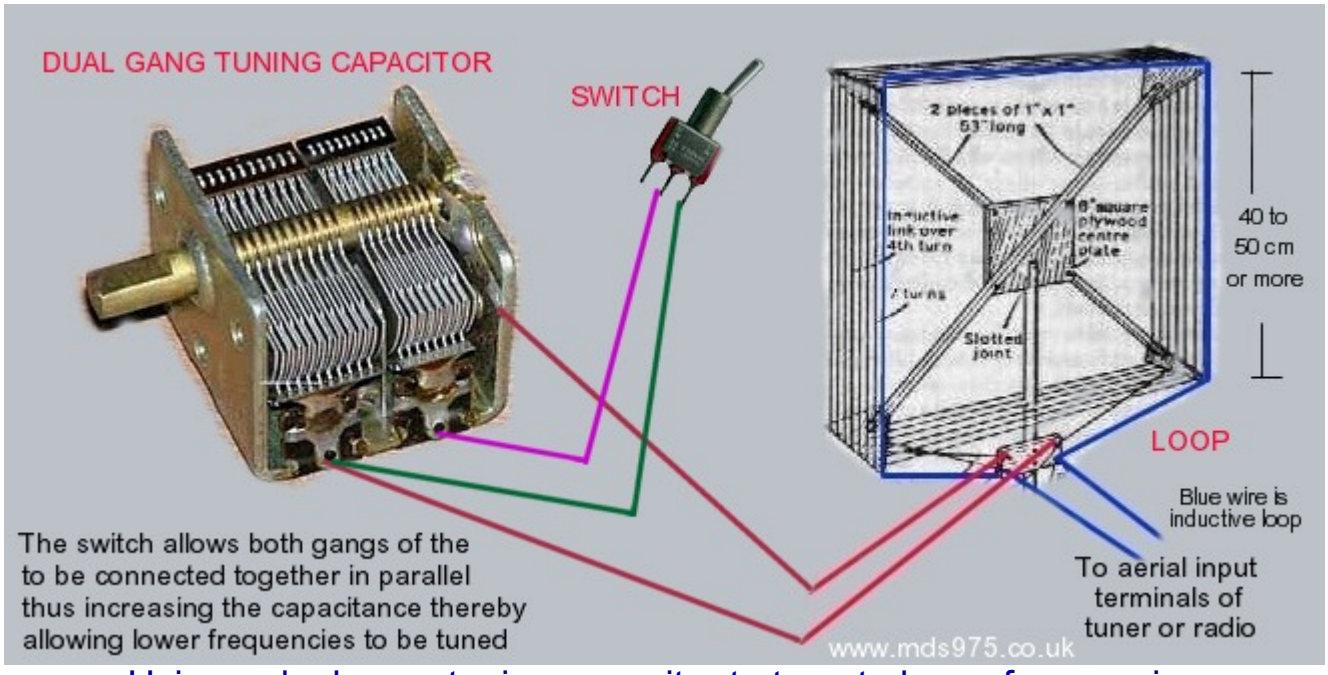
1 meter square is probably the largest size that would normally be considered practical. for a frame aerial that is used in the home, but even this may be too large in some domestic circumstances. This Long Wave loop is only 55cm wide and 150cm high and is more easily accommodated in a small 'box room'.

Some Helpful Wiring Diagrams:

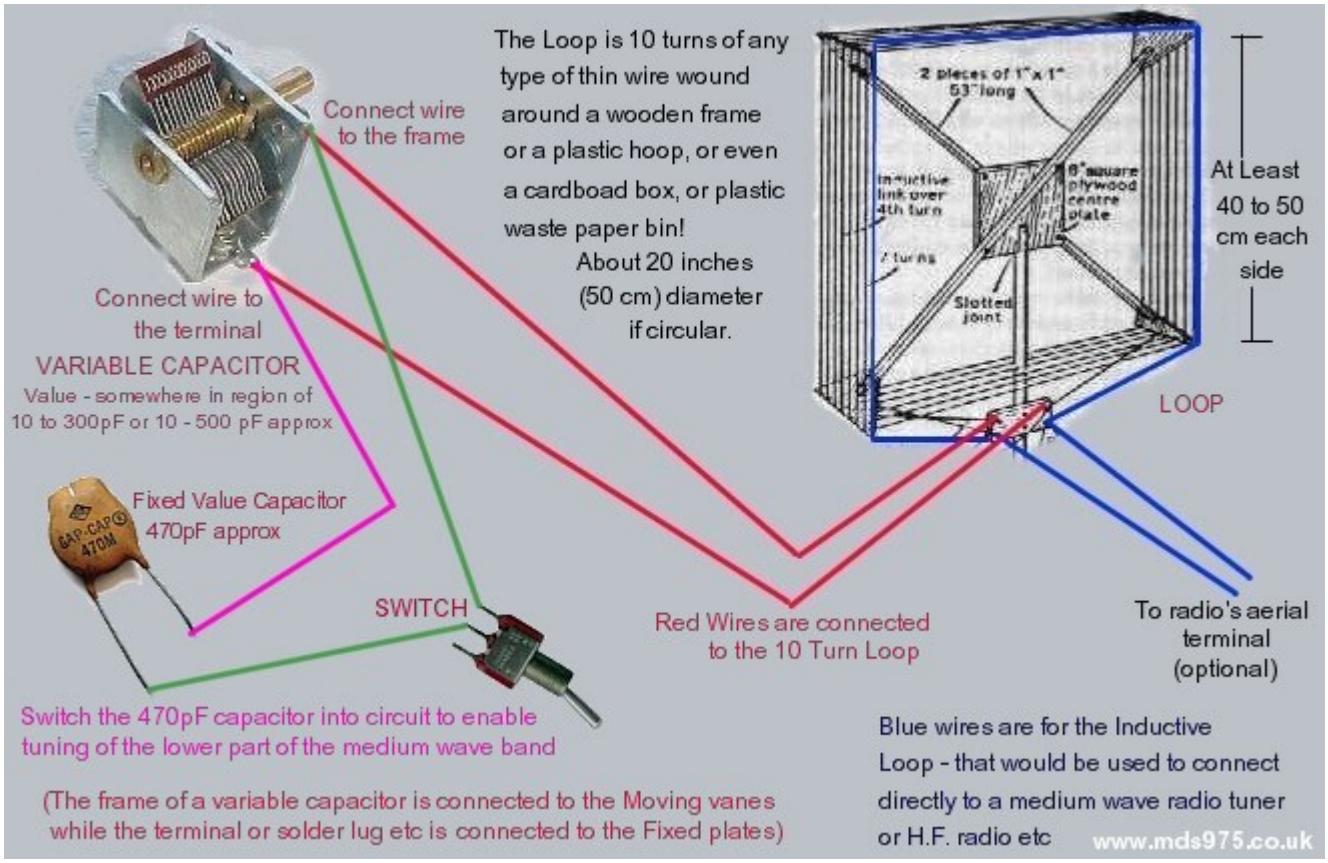
Applicable to all styles, shapes and sizes of loop aerial:



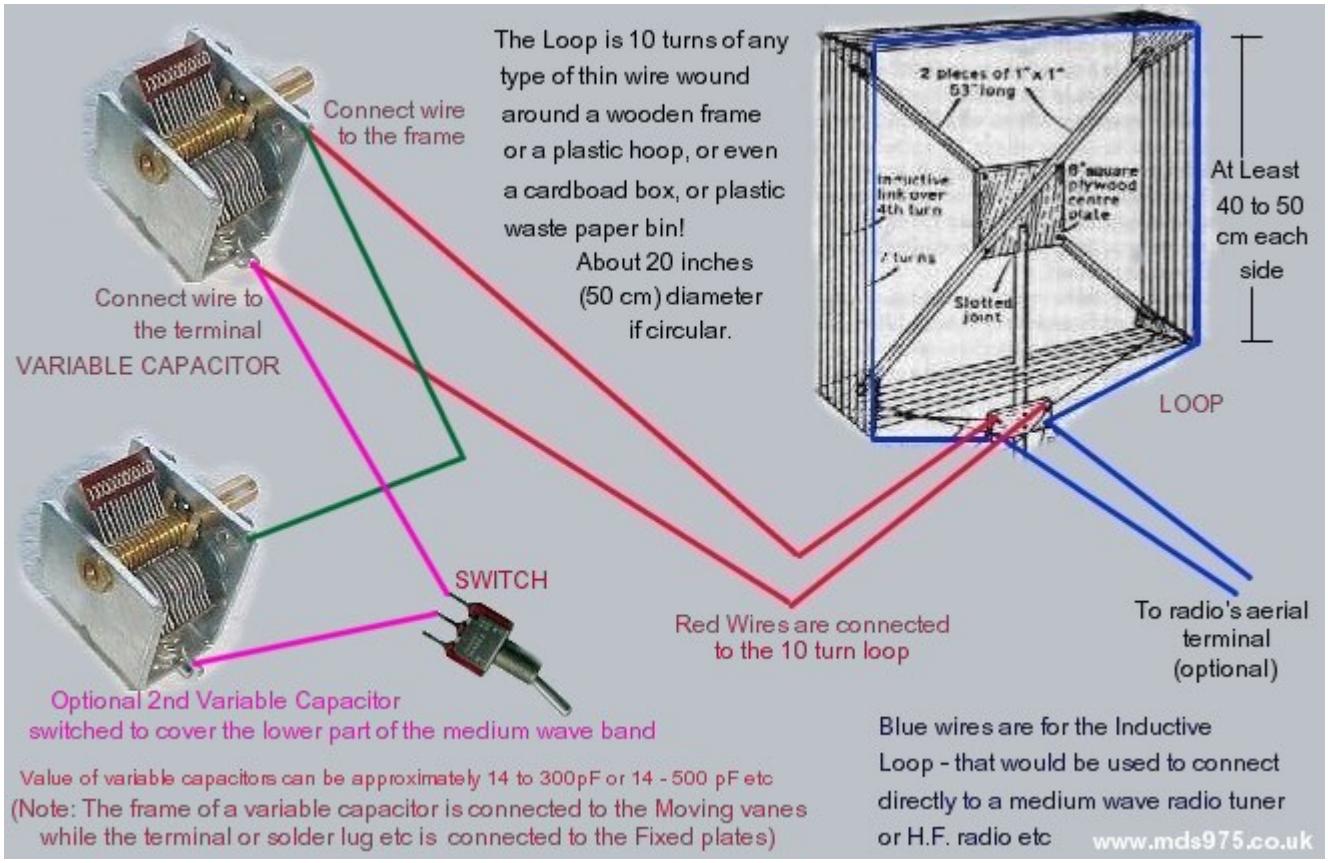
Basic Wiring of a Medium Wave Loop Aerial



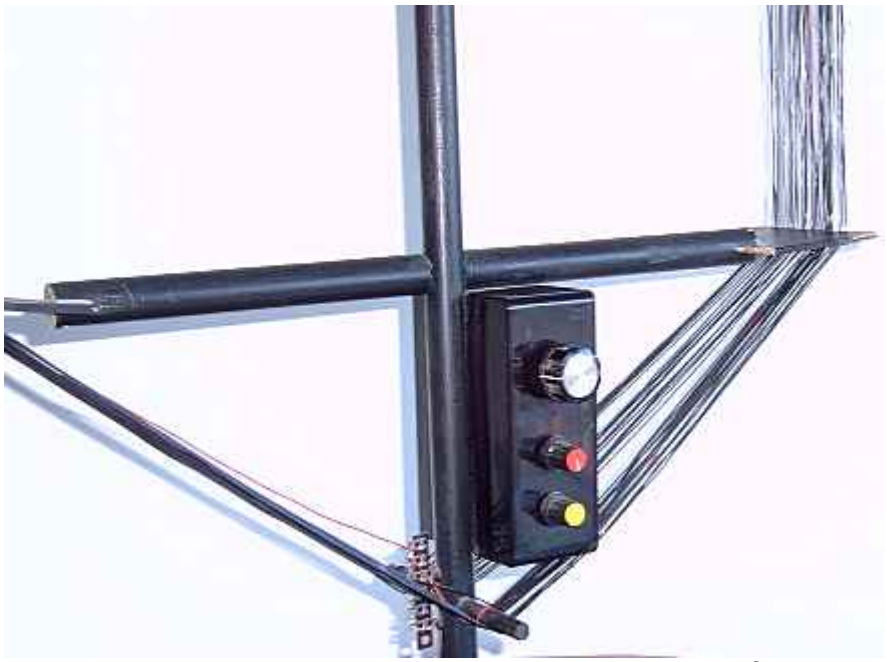
Using a dual gang tuning capacitor to tune to lower frequencies



Increasing the low frequency tuning ability by adding a switchable fixed 470pF capacitor



Increasing the low frequency tuning ability by adding an additional switchable tuning capacitor



Shown Above: A close up photo showing the 'control box' and the joint of the broom handles that for the frame. The loop windings which are first taken to a tag-strip and soldered in place before the wires are taken into the control box, this help keep the windings taught. The circuit for this loop is the same as for the portable loop above except for the addition of a variable 1k resistor across the coupled output to act as a simple attenuator.

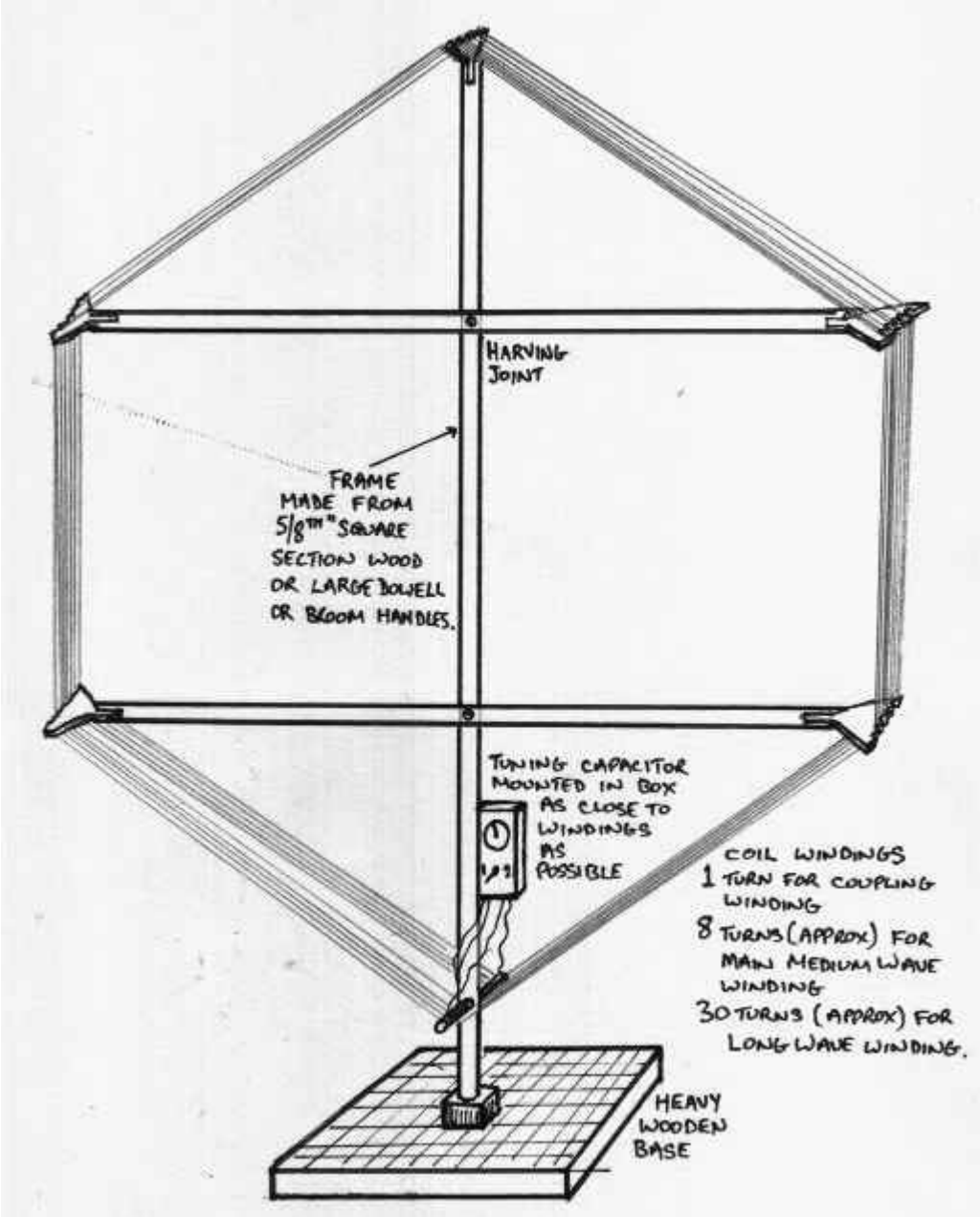


Diagram of Long Wave Loop

As shown above: For a size that might be more easily accommodated in a smaller listening room, a frame aerial can be taller than it is wide - for example between 120cm and 150cm tall and 50cm to 80cm wide.

Tuning and Operation

Find a very weak station that is almost inaudible. Couple the radio to the antenna and rotating the tuning capacitor on the frame aerial: As the resonance of the loop aerial approaches the frequency of the radio station the recovered audio will rapidly become louder and clearer until it reaches a peak. The peak of loudness will be at the exact point of resonance of the aerial - i.e. if tuned to a weak radio station on, say, 1566 Kilohertz when the audio is at its loudest the aerial will also be tuned (resonated) at 1566kHz.

The automatic gain control (a.g.c.) circuits of most radios can mask these peaking effects somewhat,

but it should still be quite obvious when the point of resonance is achieved.

Band Coverage

Two separate frame aerials will be needed to cover both Long Wave (150 to 280 kHz) and Medium Wave (510 to 1611 kHz).

With the medium wave aerial the band wave may possibly need to be covered in two parts by either having 2 tuning capacitors wired in parallel (depending on their value), or by having one tuning capacitor (of about 500pF) and a fixed capacitor that can be switched in to circuit (wired in parallel) to cover the lower part of the band.

To get the correct coverage the trick is to set the loops aerial's tuning capacitor to its minimum value (vanes open) and tune the receiver to the top of the medium wave band (1611 kHz in Europe and 1705 kHz in North America) then adjust the number of turns of wire wound around the frame until the top of the band can be tuned in and 'peaked up' by the aerial's tuning control. Since the may not be a broadcast station present it will be necessary to listen for a peak in the overall noise level.

Important: Use as many turns of wire on the loop that will still allow the top of the band to be tuned in. Don't remove a turn unless really necessary since the more turns of wire there are on the loop the better the pick up will be.

Once that is done check how far down the medium wave band the aerial will resonate.It may only tune down to 700kHz or 800 kHz for example. If that's the case then a fixed value capacitor will need to be added that can be switched into circuit - connected in parallel with the tuning capacitor. The value will vary depending upon what value tuning capacitor is being used, the size of the frame and the number of turns on the loop, but maybe somewhere between 200pF and 600pF (ish). With careful experimentation the exact value can be established that will allow a particular loop to tune down to 510 kHz - the lowest end of the medium wave band.

A Portable MW Loop Aerial

With smaller loops and a small portable radio with a built in ferrite rod ("Loopstick") aerial, it is very easy to place the radio inside the loop to obtain the best Inductive Coupling between loop aerial and the radio's own aerial. Rotating the loop and radio together for best reception by making use of the aerial's directional properties.

The Portable MW Loop Aerial, shown to the left, is much smaller than many traditional frame aerials at 40cm (17") diameter. It is designed for use with a portable radio. The radio is simply placed in the middle of the loop and the signals collected are transferred to the radio via its internal ferrite rod aerial.

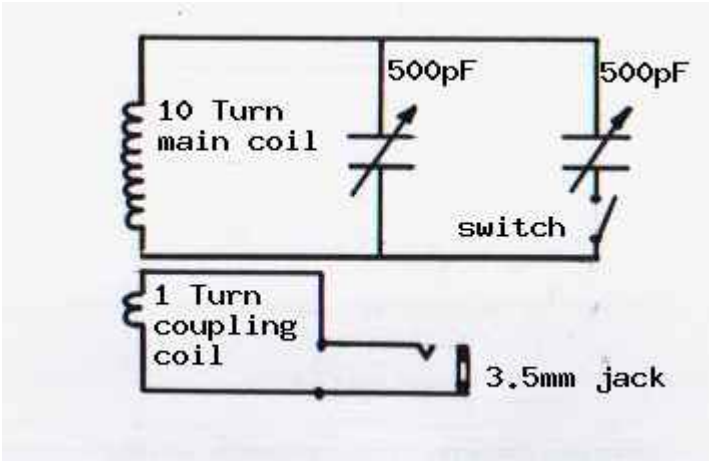
The circuit for a loop aerial could not be simpler: A continuous length of wire, such as 7/0.2mm 'hook-up' wire, is wound around the 40cm former to form a loop of approximately 10 turns*. The tuning capacitor is connected across the loop so that it can be adjusted to resonate at different

The portable loop in use, the portable radio is simply placed into the centre of the loop and the signals collected are inductively coupled to the internal ferrite rod antenna of the radio

frequencies.

(*about 40 to 50 turns for Long Wave).

If it is required to connect the loop to a radio via its aerial input terminal then a second winding of just 1 turn of wire is wound over the main 10 turn winding. This secondary winding acts as an inductive coupling coil - this is then connected to a suitable socket so that a cable ('fly lead') can be run from the loop aerial to the radio receiver's antenna jack or terminals.



The circuit diagram of the loop showing the 10 turn main winding (100uH) and the tuning capacitor, together with a second capacitor that can be switched into circuit to provide tuning of the lower frequencies of the medium wave band. The second 1 turn coupling winding allows direct connection to the aerial terminals of a receiver.

For Long Wave reception about 40 to 50 turns may be required.

The circuit diagram on the left shows the main loop winding of ten turns (100uH) and the variable capacitor which tunes the loop aerial to the required frequency. Ideally the tuning capacitor should have a value of 700pF to cover the whole of the medium wave band. However standard 500pF tuning capacitors seem to be more widely available and will generally tune the medium wave band from around 700 kHz to 1600 kHz with a 10 turn winding.

To Tune the lower portion of the band a second capacitor can be switched into the circuit to provide the increased capacity required. The second capacitor can be in the form of a variable trimmer that can be pre-set to the required value, usually around 200pF. The second capacitor *could* be another tuning capacitor (as shown in the diagram), but that could be rather expensive. Alternatively a fixed capacitor could be used, the best value determined after a little experimentation.

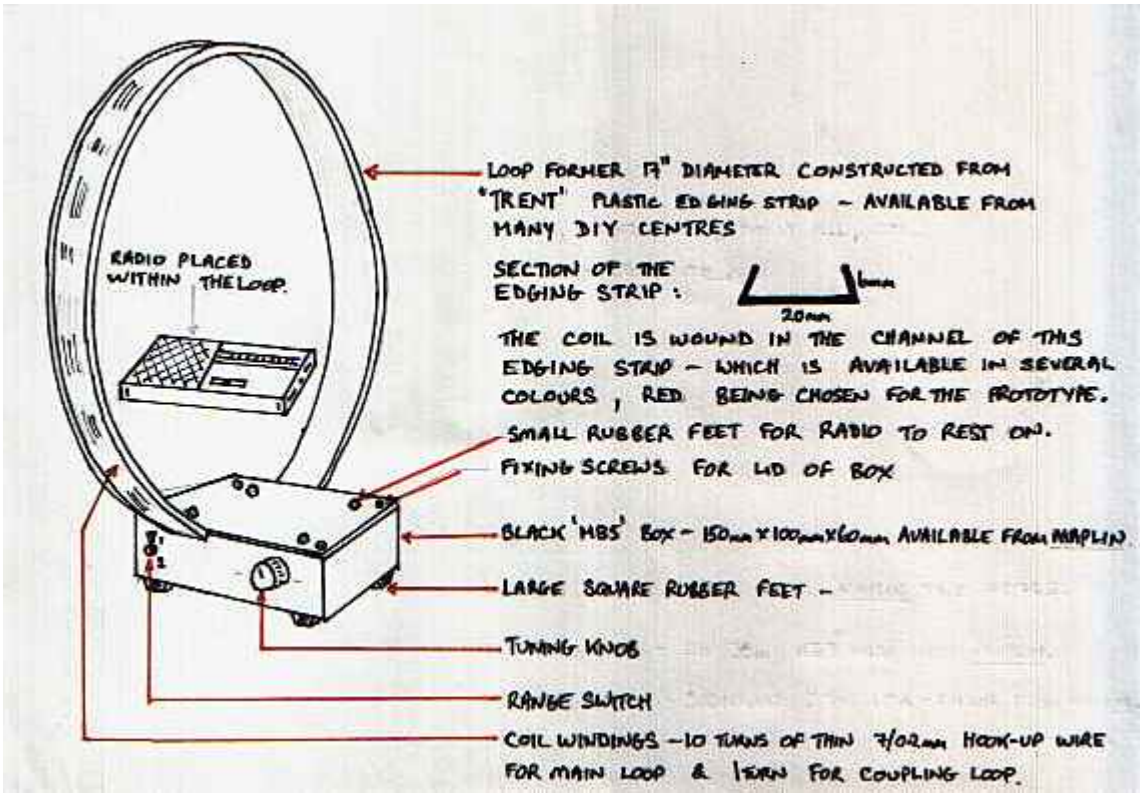
The second coupling winding is of one turn and allows the aerial to be directly connected to any radio with antenna terminals or and aerial socket.

Scanned in below are my notes for the construction of the portable loop. The former of the loop was made out of 'Trent' plastic edge strip that was available from my local DIY store. This edging is about 20mm wide with a 6mm channel, though any similar edging or plastic product such as curtain

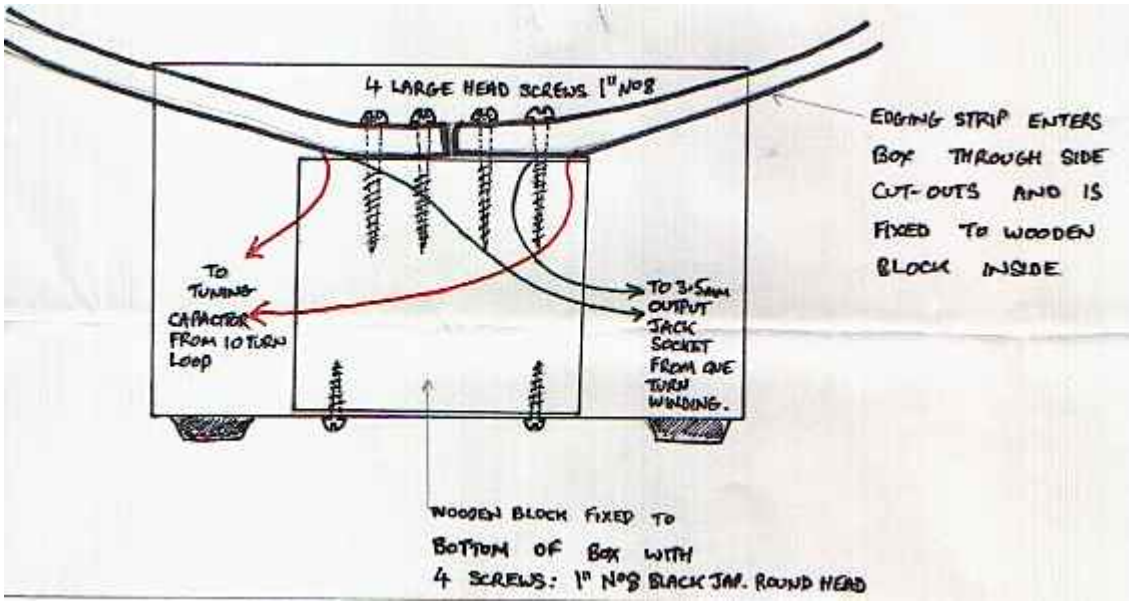
track, perhaps, could be used. The strip is bent into a circle of 40 cm in diameter with the channel on the outerside and fastened to a wooden block with some large head screws. The 10 turns of 7/0.2mm hook up wire are carefully wound side by side around the former and connected to the tuning capacitor. I used red strip and blue wire to be colourful.

The single turn coupling winding is wound next to the main winding and connected to the output socket. I simply used a 3.5mm jack socket as this is the same as on a Sony portable radio, though any coaxial socket could be used such as Belling Lee or PL259 etc.

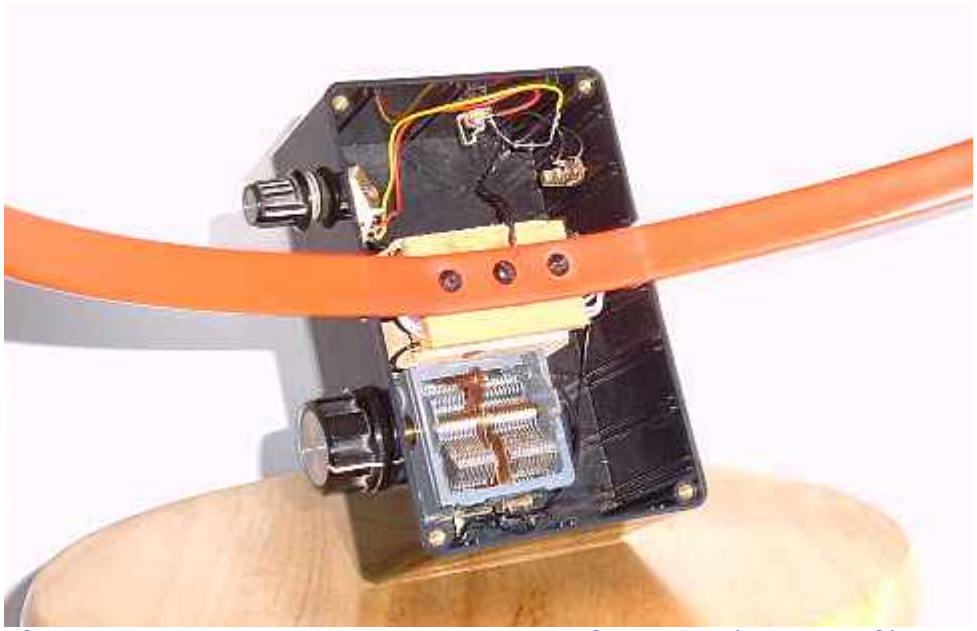
The loop and wooden block are fixed into a suitable plastic box of about 150mm x 100mm x 60mm, the wooden block and heavy tuning capacitor adding weight to aid stability. A suitable box would be BOX034 from Bowood Electronics.



Drawing showing the external appearance of the Portable Loop Aerial

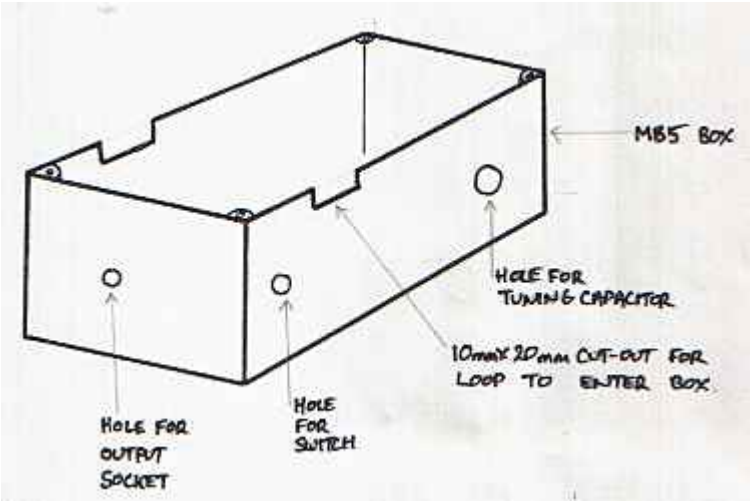


Drawing showing how the loop is fixed to a wooden block and secured into the enclosure

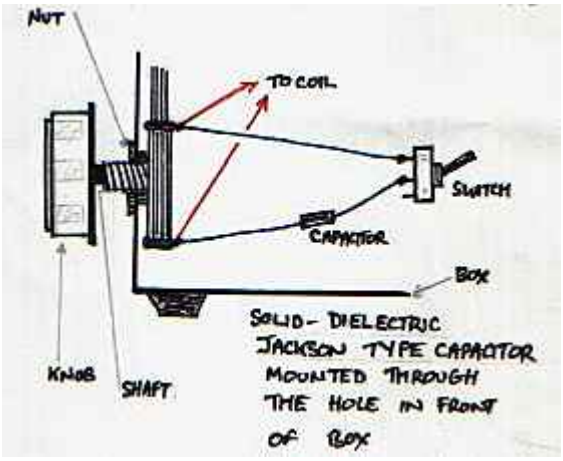


Internal photo of loop aerial showing air-spaced Tuning Capacitor (bottom left), Range Switch (top left), Output Socket (top), Wooden Block to which the loop former is attached (centre).

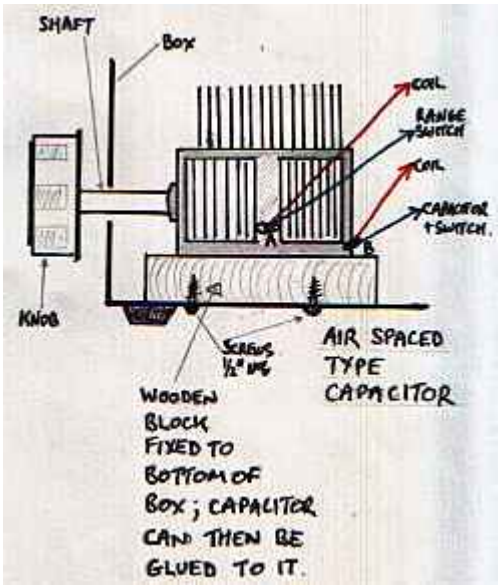
[Note the 3.5mm jack socket on the back panel (top right), this is for a crystal earphone as this loop is also a portable crystal set - see below]



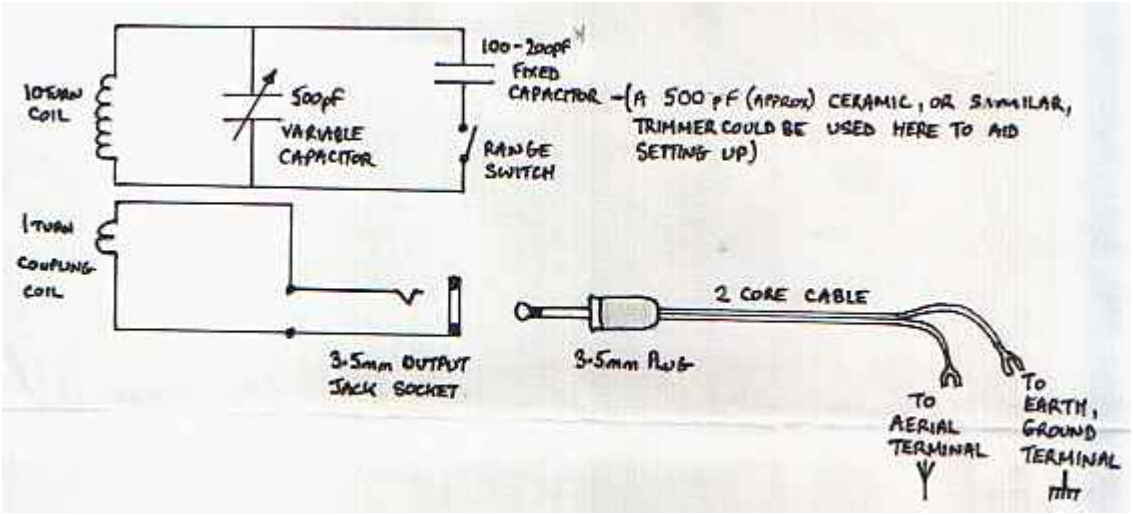
A suitable box with cut-outs to accommodate the entry of the loop into the box and holes for tuning capacitor, switch and output socket.



A solid Dielectric Jackson type tuning capacitor can simply be mounted through the front of the box and held in place with the brass nut.

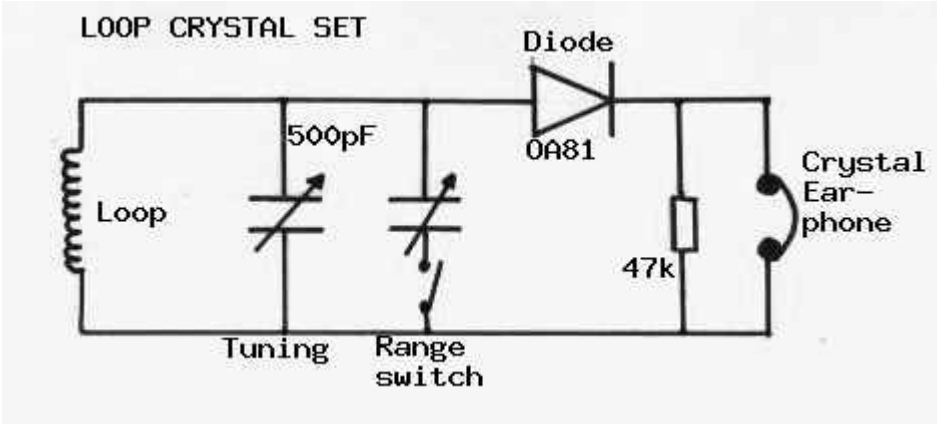


A traditional air-spaced tuning capacitor can be glued to a wooden block using Araldite which is then screwed to the bottom of the box.



Connecting a loop to a radio receiver or Hi-Fi tuner

A Crystal Set Loop!



Crystal Set Loop!

The circuit diagram above is an interesting modification to the loop aerial, and can be made to any loop aerial. With the addition of a germanium diode (not silicon) such as an OA81, OA91 or OA47, a 47k ohm resistor and a crystal earphone, the loop aerial becomes a portable crystal set which is quite effective given sufficient signal strength at your locality.

If signal strength is low then a long wire aerial could be connected to the crystal set and used in a more standard crystal set configuration. Such a long wire aerial could be coupled to the tuned circuit via a small trimmer capacitor of, say, 100pF. The capacitor would be connected to the top of the tuned circuit ("hot" side) at the junction of the main loop, tuning capacitor and diode. Alternatively the aerial could be connected by inductive coupling and would be acheived by adding a second winding around the loop consisting of, for example, one, two or three turns of wire: One end of this wire would be connected to the long wire aerial and the other end of the loop to the 'earthy' side of the tuned circuit (junction of main loop, tuning capacitor, 47k resistor and earphone in the above diagram.)

In Use

The photo on the left shows the finished Portable Medium Wave Loop in use, in this case merely placing the radio inside the loop will obtain much improved reception!

The loop is tuned to the frequency of the required radio station with the tuning knob which will really peak up the reception.

Rotating the loop will maximise the signal strength &/or minimise co-channel or adjacent channel interference for clearer reception.

Using this loop I can hear distant local stations that would otherwise be completely impossible to receive and it helps improve reception on all other weak stations. It's a nice little project that produces a really useful listening aid.

Once you've built this little beauty you may want to try something a larger frame aerial design shown near the top of this page.

The Portable Loop in use!

LOOPS FOR HIGHER FREQUENCIES

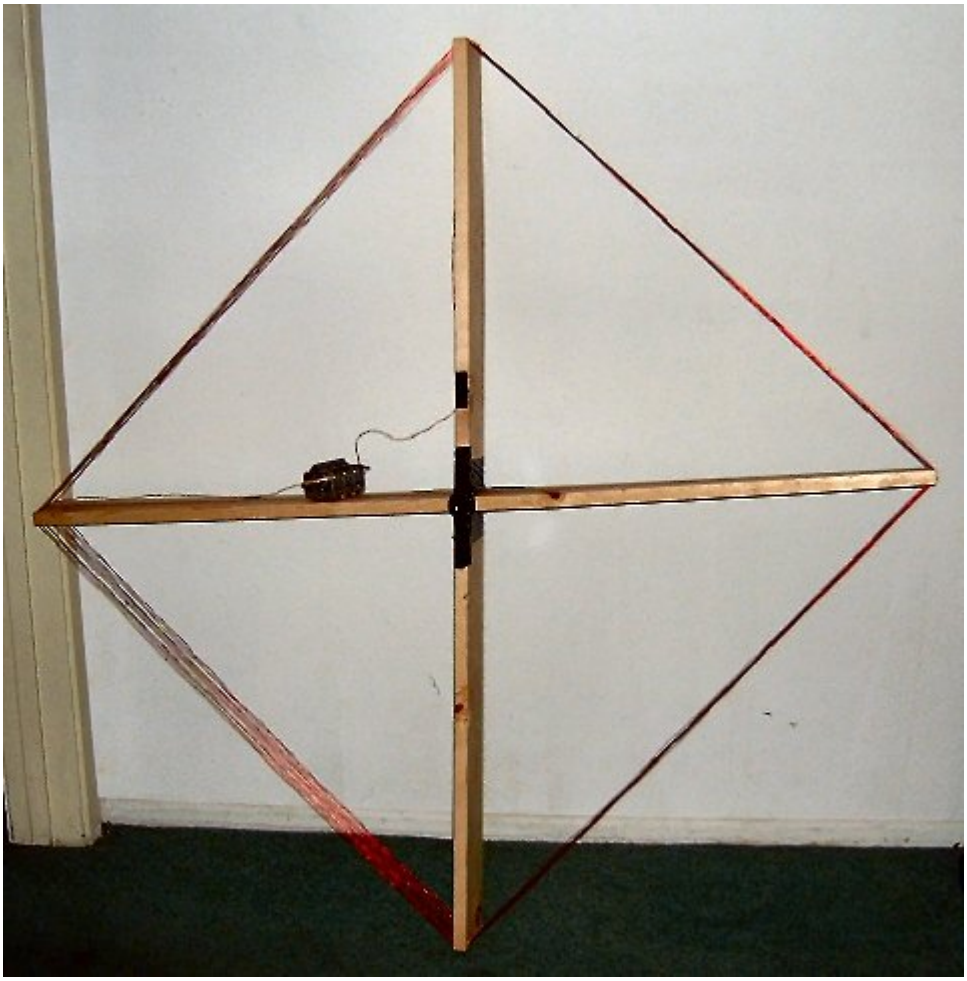
I have done a little experimentation with loops above 1.8 MHz, but not too much. My observations are thus:

It will take a little experimentation with the number of windings on the loop to get the required frequency coverage. The actual number depends on the size of the frame that you are using. To be able to resonate these higher frequencies the loop aerial requires fewer turns than the standard medium wave loop. Try removing 2 or 3 turns of winding from a medium wave loop and see where that gets you: Then subtract one turn at a time until the desired frequency range is achieved. Ideally the starting point of tuning at the lower end of the range should be around 1.8 MHz with the tuning range going up to about 3 MHz. This should cover some interesting transmissions including the "Top Band" of the Amateur Radio ('HAM') bands.

The coupling loop remains at one single turn whatever frequency range you are receiving.

It is important to note, however, that the fewer turns that the loop has (i.e. in order to tune to these higher frequencies) the less signal will actually be picked up - in my experience this reduced signal pick up has been quite noticeable! I found that for acceptable pick-up the frame needed to be at least 1m square. Smaller loops just don't present enough signal. It is for this reason that loops designed for long wave reception will necessarily have many more turns than a medium wave loop and will therefore be much more effective at collecting signals.

A loop for the higher frequencies above the medium wave band could be useful for direction finding and particularly for reducing co-channel interference (assuming the interfering station is at about 90 degrees to the required station), but for chasing weak signals a long random wire, possibly with an ATU, will be much better from my observations. An interesting experiment none-the-less.



Above: Photo of a frame aerial sent in by an MDS975 reader - A very fine example!

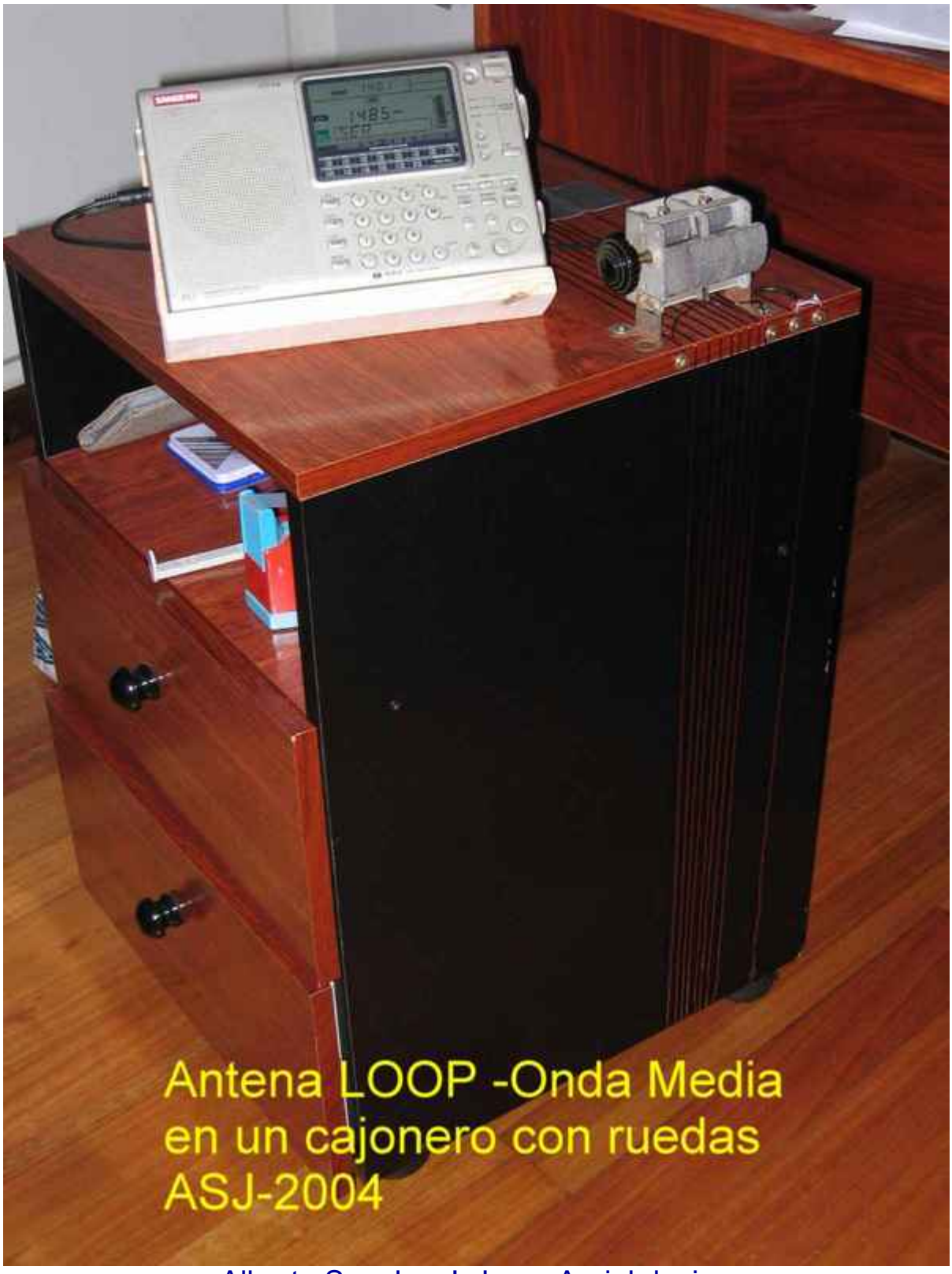
AN INCONSPICUOUS LOOP AERIAL

An Interesting Loop Aerial Idea by Alberto San Juan who writes:

I like very much your web page (radio section), being very helpful to me. I also have a Lowe HF-150 and have installed my loop antenna around the small chest of drawers next to my desk, as you can see from the photograph below.

This method of construction has many advantages:

No big frames on your table.
Strong support, so it never falls over.
Gives you extra space.
Easy to move and rotate, it also has 4 wheels!
Easy to clean.
Easy and quick to hide under the desk/table.
You can place your radio on top of the aerial windings, or connect to receiver via cable.



Alberto San Juan's Loop Aerial design

So there you are - LOOP and FRAME AERIALS - cheap and very easy to make! The portable loop certainly looks the part, being very neat and tidy. The larger frame aerials are by their very nature more obtrusive, but can be even more effective at collecting radio wave energy due to their extra size. If construction is kept neat and tidy with the rough edges rounded off and the controls housed in a neat box a big loop need not be a major eye-sore.

Good Luck with YOUR loop aerial and happy LW and MW DX-ing!

Next I'll take a look at Antenna Tuning Units which will help match your long random wire aerial to your radio. ATU's, as they are known, will help with Short Wave reception as well as Long and Medium Wave too. ATU's Aerial Tuning Units

QUESTIONS ABOUT AERIALS

Hi Mike, I like to listen to the George Noory programme Coast To Coast AM (I miss Art Bell) on WFLA 970KHz AM. The problem is, when I do copy the station, it's always oscillating in and out and/or mixing with some tropical station (I'm in South Florida US).

I tried an external loop with fewer turns and no capacitor and just got similar results as a long wire (except when I turned the loop to attenuate both stations simultaneously). My DX'ing SWL longwire just picks up the QRM even with a selective Hallicrafter's Sky Champion. I was considering building and aiming a beverage antenna of hundreds of feet with a terminating resistor just to try to isolate this station.

Upon building your 40 cm loop with 10 turns and a 400 pF air cap, I now make the station resonate so well that it successfully overpowers the interference and takes charge when aimed and tuned. I only regret making the housing out of cardboard. The loop is that orange plastic race track that Hotwheels or Matchbox cars use from the 70's (it's that old, too).

I can't believe I'm listening to near-perfect "Coast to Coast" exoscience and UFO's etc. real time over the air. Ham Art Bell who started the show would be proud.

And I can add a switched 200 or so mica cap for the lower AM & take this with me to play with on the road (my radio to use with this is one of those Sangean, Tecsun, or Crane-like radios but sold by Radio Shack in their death throws and it just loves the loop). Can't wait to try top band. I wonder if I would ever pick up any long wave here with a LW loop? I was going to try the long-wire and switch the ground/cap configuration on my L-Match to effectively lengthen it, but darn the loop might work better.

Cheers and thanks again!

Jeff Burris
W4VEY
Tampa FL USA
(February 2016)

Hi Jeff,

Great to hear from you! I have listened to Coast To Coast with George Noory on past visits to Canada and enjoyed the programme very much too!

I am glad that you built the loop antenna and find it so useful and effective! I use mine regularly.

There is an AM station that I like to listen to - Manx Radio on the Isle Of Man. Unusually for a UK station, their transmitter has a 'figure of eight' radiation pattern. About 20 kW e.m.r.p. to the north-east and south-west, but only about 200 watts e.m.r.p. to the north-west and south-east - in my

direction. The loop really helps bring it in at night!

Not sure if you'll receive European long wave in FL, but I think it's been done. You'll need a big aerial, so perhaps the larger 150cm loop could work for you!

I want to make the most of this AM reception while I can since it is quite likely that many, if not most, AM transmitters in the UK will close by 2018 to 2020. BBC Radio Four on long wave is quite likely to close in 2020 and the largest AM 'network' in the UK (BBC Radio 5) may close by 2023. All these radio stations are already simulcast on DAB Digital Radio in many parts of the UK, with many listeners already choosing that method of listening. Some AM transmitters may carry on for a while after 2023 to cover areas that are difficult to reach with VHF radio (DAB digital radio is on VHF in the UK).

I love those big powerhouse (50kW) north American AM radio stations! They often have complex transmitter systems, with multiple mast phased arrays so that the radiation pattern can be extremely directional, with different day and night patterns and powers.

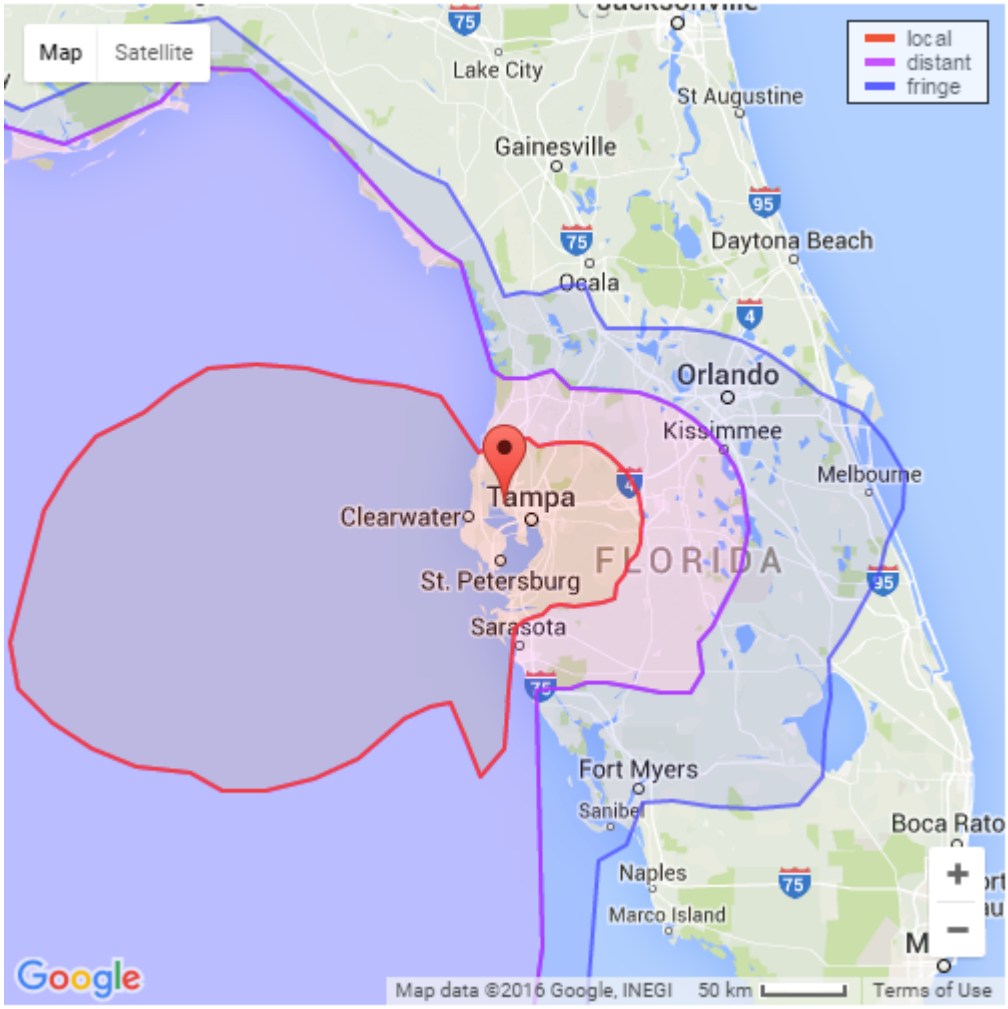
Often the night time power is a fraction of the day time power, and often more directional too, so that interference to other, more distant stations is limited. This can, of course, considerably weaken the reception to some of the station's more local listeners - possibly as you have found, particularly with interference coming in from foreign stations, causing co channel interference and fading.

WFLA 970 has five towers. I can only see three of them in the Google Maps screen shot below.

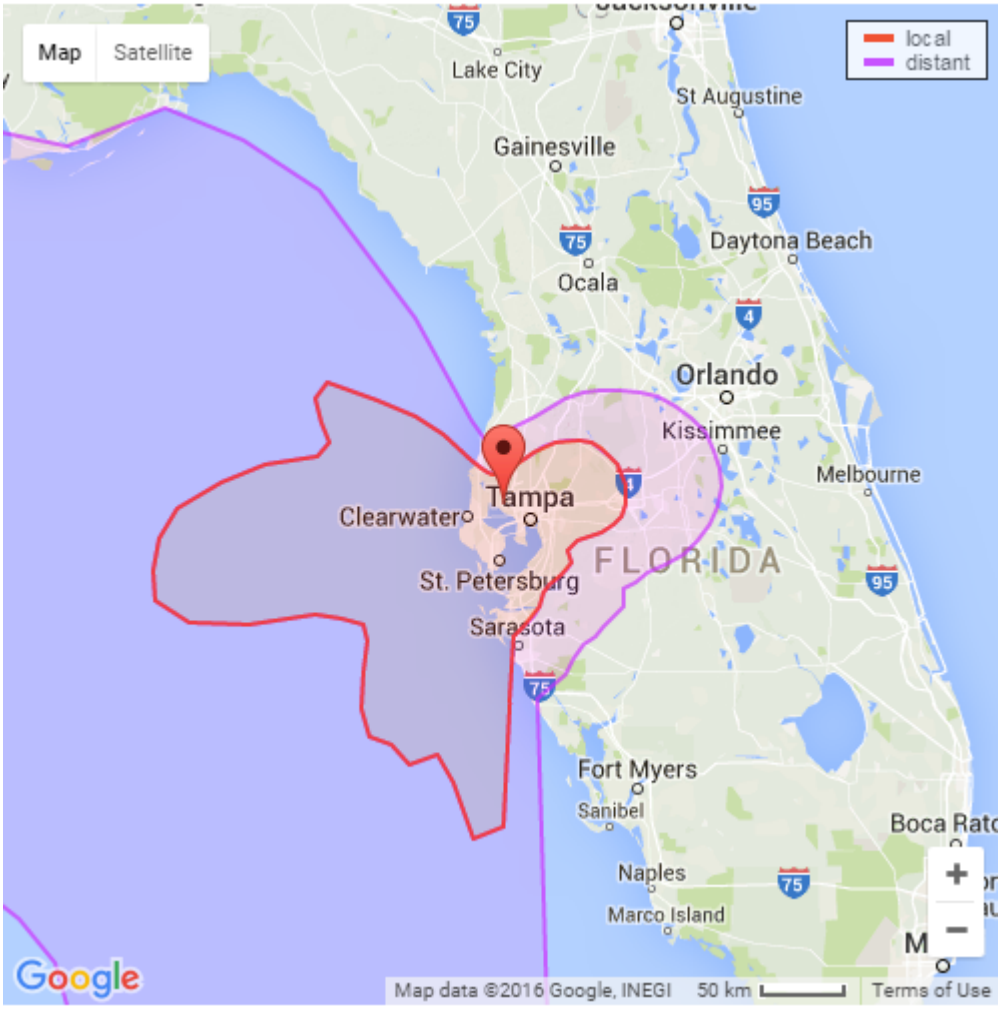
Four towers are used during the day to produce a directional pattern with a maximum power of 25kW.

Five towers are used at night to produce a more restricted coverage area, with a maximum power of 11kW. See maps below.

WFLA 970KHz AM transmitter site - only three of the five towers can be seen



WFLA 970KHz AM daytime coverage
http://radio-locator.com/info/WFLA-AM



WFLA 970KHz AM night time coverage
http://radio-locator.com/info/WFLA-AM

73 for now!! Happy listening and DXing!
Mike.
--

Hi Mike, I am in outback Queensland Australia, quite remote, so radio is very important to us out here. My use for my antenna will be to pull in distant AM broadcasts from within Queensland (200 to 500 kilometres away) and just very occasionally from interstate in outback areas of Australia. Mostly the signal may not be reflected, just very weak due to distance. Hope you understand my dilemma.

I have constructed a square loop frame with 750 mm sides (diameter) with two 320pf air gap tuning gangs. It tunes stations relatively well. My question relates to the wire length for the primary winding. I took some suggestions regarding length calculations for aerials and found most way too long for the gangs to be able to tune. I removed wraps one at a time as you suggest until I could get the higher frequencies to 'peak'. That is all good, but the result is that I now have only six (6) turns of wire in the primary. Only 18 metres. Since a full wave is about 300 metres, I feel there ought to be at least a quarter wave of wire in the primary, 75 metres. Is there any use in increasing the length of the primary coil to 75 metres? If so how can that be done?

Your advice will be enormously appreciated. Yours faithfully, Geoff Douglas. (February 2015)

Hi Geoff,

Thanks for your email.

I found the medium wave loop antenna to be an extremely rewarding project. I am sure that you will find it very useful too.

With regard to your question concerning wire length: The length of the wire does not really have quite the same relationship to wavelength that you might expect if you were dealing with more familiar receiving (and transmitting) aerials.

The aerials that many radio enthusiasts may well be familiar with are the Half Wave Dipole, the Quarter Wave Vertical Monopole or Full Wave Loop, for example.

The Half Wave Dipole is fed at the centre and consists of two quarter wave 'arms' either side of that central feedpoint. Such an antenna is often seen installed horizontally, so its form will look like a T - the vertical feeder cable feeding the two 1/4 wave 'arms'. The total length of the antenna is therefore half a wavelength long. So for a medium wave frequency of (for example) 720 kHz (416 metres) the aerial would be (approx*) 208 metres long.

The Quarter Wave Vertical Monopole is simply one half of a Dipole, fed against ground. So it would be (approx*) 104 metres high. The ground may be a network of radial wires and earth rods. Sometimes the vertical section may be 'loaded' to shorten it, thus reducing its efficiency. Alternatively, for reception, it may be installed as an Inverted L form: Made out of wire, the vertical section would be supported on a non metallic vertical pole as high as practicable, with the remainder of the aerial wire run out horizontally to be supported at its far end by another supporting pole, building or object.

The Full Wave Loop is, as its name suggests, is a loop of wire that is one full wavelength long at its design frequency, in this case (approx*) 416 meters long. It might be supported as high as possible above the ground on suitable poles or towers, as a horizontal circle or more often a square. The feedpoint will be a some point on its circumference.

The medium wave frame aerial is slightly different. Certainly, for a given size of former (frame) a longer length of wire will be needed for longer wavelengths. However, the loop forms a tuned circuit with the capacitor. The frequency (wavelength) that the loop will be most sensitive to is determined by the capacitance of the variable capacitor and the inductance of the loop's aerial winding: The more turns of wire on the inductor, the lower the frequency that will be attained. Also, the larger the inductor, the lower the frequency will be covered - so for a given frequency, the larger the frame the fewer number of turns will be needed.

Similarly, the larger the capacitance, the lower the frequency.

It's worth noting that the larger the frame, the larger the area, and hence the greater the signal pick-up - which is a useful consideration when trying to receive weak and distant stations. 1 metre square frames are quite popular.

You'll see, therefore, that it's not quite as simple as a quarter wavelength of wire is needed for a given wavelength!

I wonder what specific stations you are trying to receive?

I hope that helps.

Happy listening.

(* Aerials such as a Half Wave Dipole or Quarter Wave would, in practice, be about 5% shorter than the actual calculated length)

Geoff replied: *Hi Mike, Thank you for getting back to me so soon, and thank you also for the detailed explanation. It is difficult to find someone with such knowledge nowadays. Yours is a dying art among the general community.*

It seems I have it working as well as can be expected. I have added a secondary single turn loop. It has helped the gain considerably. So much so that I often receive signals from Asia which drown out the Australian ones on some stations. Not the antenna's fault I know.

I now want to add some coax so that I can mount the antenna on a stick above ground outside the building at about 10 metres height. So the receiver will be about 15 metres from the loop antenna. Is that going to work without a booster. If a booster is needed, can you suggest a good one.

Thank you so much. Appreciate your advice. I don't have a lot of neighbours close about who I could ask for such advice.

Yours faithfully, Geoff Douglas

Hi Geoff, You can use coax to connect the loop to a radio receiver. The effectiveness can depend on the receiver itself - some tuners work quite well with a direct connection, while others may be overloaded and would work better with an inductive coupling coil placed near, or on their own ferrite bar antenna.

A booster should not be required, but it may be possible to use something like a differential amplifier, perhaps, if one was needed. I doubt it will though.

With regard to remote location; bear in mind that once placed away from the radio receiver, the loop will be tuned to just one frequency - one station. To change the frequency, you'd have to go outside every time and re-tune the 320pF capacitor! I would experiment first; the performance should be better outside, but the difference may not be worth the bother. Remember too that the aerials components would have to be fully and effectively weather sealed.

Best wishes, Mike.
--

Hi Mike, Thank you indeed for sharing your knowledge. It is nice to communicate with someone who is clued on these subjects.

I should have mentioned earlier, the receiver is a Sangean ATS- 909. It has a external antenna jack, as well as the ferrite rod and telescopic. It also has adjustable gain control. The frequencies I am most wanting are between 540 khz and 700 khz. There is the odd commercial station around 1100 - 1400 khz, but they are not critical.

Thank you for the heads up on the external antenna set up. I was planning to make it demountable so that it can be inside in inclement weather and in situations where it is not needed externally. We have pretty dry conditions mostly anyway, and no frosts at all.

Other folk around here are very interested in your thread. So you are helping several other than just me.

Thank you again, Cheers, Geoff.

Hi Geoff, It's worth trying a direct connection to the ATS-909 if it has a variable gain control. The usefulness of the gain control depends on where it is placed in the front end circuit. If is is placed after the first stage of any RF amplification, it may not be entirely effective with strong signals as the first stage may already be overloaded before reaching the subsequent gain control.

Overloading will be noticeable by an increase in background noise and inter-modulation problems, for example. In which case you could add a variable attenuator into the feed-line, or simply use inductive coupling to the radio's internal ferrite bar antenna.

With regard to some stations being swamped by other stations from Asia, then you can try rotating the frame aerial to null out the interfering signal. The the nulls are fairly sharp and can help reduce the unwanted station enough to make the wanted station audible. The long distance interference will no doubt be received at dusk and after dark when the lower D Layer (about 50 miles above the earth) of the ionosphere dissipates and allows signals through to be reflected from the higher F Layers (about 100 to 300 miles above the earth) in the ionosphere, causing longer distance (DX) reception of those stations.

I am glad that others are interested in this idea too!

Thanks for getting in contact.

Best wishes, Mike.
--

Radio Stations & Memorabilia | **ATU's Aerial Tuning Units** | **Copper Tube Antenna**

DXing & Short Wave | **Make A Signal Meter** | **Riding On A Radio Wave**

^Top Of Page

Home | Contact | Site Map | Reciprocal Links & Credits | Thank You